as rapidly becoming extinct. In some modern countries, the *noblisse* of the second order is kept up only by the multiplication of letters patent of creation. Thus, in some of the provinces of Holland, there does not exist a single family of those formerly inscribed on the registers of the equestrian order. At Berne, at the end of the last century, there remained only one half of the noble families who attained a permanent seat in the councils of the state during the 16th century. Almost all the great historical families in all countries have become extinct.

In England, it appears from two papers by Jno. T. R. Edmonds published in the *Lancet* (10th Feb. 1838 and 9th March 1839), that in the year 1834, there were only 74 titles in the English peerage which had endured more than four generations, or more than 133 years; and of these only 13 had descended in a direct line for as many as six generations. Of this small number two (Huntly and Essex) have since passed into collateral branches by the death of their holders, and three others will most probably do so upon the decease of the present peers. On comparing the mortality among the ancient peerages with that among the more modern, it was found that at ages under 40, the mortality of the total occupants of the ancient titles is considerably greater than that of the occupants of modern titles. Some improvement, however, has taken place in this respect during the last century, as the mortality of occupants of ancient titles during the last four generations have been less than that of their predecessors. —*Quarterly Journal of the Statistical Society of London*, Jan. 1840.

53. *Excess of male births among the Jews.*—In Hamburgh the whole number of living births from 1826 to 1837 inclusive, among Christians were boys 52,590, and girls 24,197, being in the proportion of 100 to 105.76. In the same city and during the same period the living births among the Jews were boys 1359, girls 1190, being a proportion of 100 to 114.81.

In Prussia on an average of fifteen years from 1820 to 1834, the proportion of female to male births among the whole population, including Jews was 100: 105.97, and among the Jews alone 100: 111.21.—*Ibid.* July, 1839.

54. *Mortality of Small-Pox after Vaccination.*—According to Dr. Heim, there occurred in Wirtemberg between the years 1831 and 1836, 1055 cases of small pox after vaccination, of which 75 proved fatal, being at the rate of 7 per cent. Dr. Gregory states that there were admitted into the Small pox Hospital of London between 1835 and 1839, 748 cases of small pox after vaccination, of which 53 proved fatal, being the exact same rate of 7 per cent. This can hardly be an accidental occurrence, the number being too large to admit of such a supposition.—*London Medical Gazette*, June 26, 1840.

ANIMAL CHEMISTRY.

55. *Medico-Chemical history of Milk.* By Dr. G. Bird.—Milk is a white opake fluid, possessing a bland, sweetish taste, secreted by certain glands in Mammalia, and designed for the nourishment of their offspring.

The specific gravity of cow's milk, which may be assumed as the type of the different varieties of this secretion, is about 1.030. This, it is obvious, is far from being constant, as it must necessarily vary with the amount of solid matters present, and which depend upon the health, vigour, age and nourishment of the animal, as well as on the time that has elapsed since parturition, and other causes.

Under the microscope, myriads of extremely minute globules are seen floating in milk; these, on account of their extreme minuteness, appear black at their edges, and with a magnifying power of 100, the largest of them does not exceed in diameter, according to Raspail, .00039 inches. On the addition of a drop of solution of potass, the globules are seen to vanish, and a limpid fluid is left.

As the opacity of milk depends on its holding in diffusion myriads of opake globules, Sir A. Cooper has, by straining it repeatedly through a filter sufficiently fine, separated the opake particles. On submitting this to the test of experiment, I have also found it to suceeed most perfectly, a nearly limpid fluid resulting after the milk had been repeatedly filtered.

The simplest mode of regarding milk is that of an emulsion, formed by the intimate mixture of a fatty matter termed *butter*, with an albuminous constituent, called in chemical language, *casein*. The intimacy of the mixture is doubtless increased by the presence of sugar of milk, as saccharine substances are well known to possess the property of forming imperfect emulsions with oils.

Cow's milk contains on an average about 10 or 11 per cent. of solid matter, made up of organic and saline constituents.

When milk is permitted to repose for a few hours a large proportion of its oily constituents, mixed with some of its caseous matter, slowly separates from the mass of fluid, and being of lower specific gravity than the latter, rises and forms an opake layer on its surface. This lighter portion is termed *cream*, and the milk from which it is thus separated is popularly termed *skimmed milk*, because the cream is skimmed off, for the purpose of being converted into butter. The specific gravity of the cream is on an average 1.0244, and that of skimmed milk, 1.0348, the greater gravity of the latter affording a sufficient explanation of the phenomenon of the cream floating on its surface.

If the milk from which the cream has been thus separated, be left to itself, it sooner or later undergoes a spontaneous change, some free lactic acid becoming developed, and the albuminous constituent, *casein*, separates in large white coagula. The development of lactic acid, in all probability, arising from the reaction of caseous matter on the saccholactin, or sugar of milk, as lately pointed out by M. Fremy. This always takes place with greater rapidity in warm than in cold weather, and is hastened during an electric state of the atmosphere, as during a tempest. The addition of a small quantity of any free acid, or of the well known *rennet*, greatly facilitates this change and consequently coagulation of the caseous matter. The serous fluid from which the *casein* or *curd* has been thus separated, is popularly termed *whey*.

When whey is submitted to evaporation so as to free it from a large proportion of water, it on cooling crystallizes in small brownish grains; constituting sugar of milk. In Switzerland a very large quantity of this sugar is procured from the whey left after separating the curd in the process of cheese making, and is used by the peasants for all the purposes to which cane sugar is applied in this country.

Sugar of milk consists of—

Carbon	45.94
Hydrogen	6.00
Oxygen	48.06
	100·00

It is generally stated to be incapable of undergoing the vinous fermentation, although an alcoholic fluid termed *koumiss*, has been long prepared by the Tartars from mare's milk. It is now, however, placed by the researches of Hess, (Poggendorff, *Annalen* 21., 194,) beyond a doubt, that sugar of milk is capable of being converted into alcohol by fermentation, although not with so much readiness as cane or grape-sugar.

A layer of cream formed on the surface of milk by repose is by no means homogeneous, for on carefully examining it, two distinct portions, not, however, separated by any very evident line of demarcation, may be made out; of these the uppermost is richest in butter, and the lowest in caseous matter. The average proportion of cream separated from milk by repose is about one-eighth, but this varies considerably.

When cream is submitted to mechanical agitation, as in a churn, it separates into two portions, the one being a soft fatty substance of an agreeable odour, constituting the well known butter; the other is a more serous fluid, holding some casein, some sugar, and saline matters in solution, and termed butter-milk,

the petit-lait of the French. Butter generally contains about one-sixth of its weight of caseous and other matters mechanically mixed with it; these by careful fusion become separated, and then the butter may be kept for a long time without becoming rancid.

After butter has been carefully fused, filtered through paper whilst melted, and well washed with water, it is nearly pure; in this state, 100 parts of hot alcohol dissolve 3·46 parts of it. Butter thus purified, contains, like all other fats, *oleine* and *stearine*, with the addition of a third fatty ingredient peculiar to butter, and hence named *butyrine*.

Anything like a quantitative analysis of milk can, it is obvious, be considered in no other light than that of affording an approximation to the average proportion of its principal ingredients. The following are the results of the analysis of Berzelius.

1000 parts of *skimmed milk*, of specific gravity 1.033, contained —

Water	928.75
Ceseous matter with traces of butter	28.00
Sugar of milk (saccholactin)	35.00
Lactic (acetic) acid, acetate of potass, and traces of a salt of iron	6.00
Hydrochlorate and phosphate of potass	1.95
Phosphate of iron	00.5

1000 parts of *cream*, of specific gravity 1.024, consisted of

Butter	45
Caseous matter	35
Sugar of milk and saline ingredients	44
Water (*butter-milk?*)	870

By incineration, caseous matter leaves above 6.5 per cent. of ashes, consisting chiefly of phosphate of lime.

The caseous matter, or casein of milk, constitutes the basis of cheese: it may be considered as bearing the same relation to milk, that the albumen does to blood.

It is, indeed more than probable, that casein is but a modification of ordinary albumen, and hence may, in a physiological sense, be considered as the albuminous principle of milk. Casein is precipitated from its solutions as in milk, by the addition of acids, which indeed appear to combine with it, for by separating them by a very simple chemical process from the coagula, the casein once more becomes soluble in water. A familiar example of the coagulation of casein by an acid is met with, in the vomiting of curdled milk by suckling infants; the coagulating agent in these cases, is probably hydrochloric acid, which, from the researches of Dr. Prout and Leopold Gmelin, appears to be constantly present in the stomach. The rationale of the disappearance of this disagreeable symptom, on the administration of a few grains of chalk or magnesia, is hence sufficiently obvious.

Casein, when rendered as pure as possible, consists, according to the analyses of Gay Lussac and Thenard, and Berard, of —

	Carbon.	Oxygen.	Hydrogen.	Nitrogen.
Gay-Lussac and Thenard	59.78	11.41	7.43	21.38
Berard	60.07	11.41	6.99	21.51

Damp casein, when set aside in a warm place, rapidly undergoes putrefactive fermentation, and a complex mass results, consisting, according to Prout, of two substances, termed caseic acid and caseous oxide, or according to Braconnot, chiefly of a matter termed aposepodine.

Milk drawn shortly after parturition, differs in its physical and chemical character from milk drawn at a more distant period. This variety is termed *colostrum;* that of the cow is yellow, mucilaginous, and occasionally mixed with blood; it contains but mere traces of butter or other fat, and appears to contain albumen as one of its ingredients, as by exposure to heat, it completely solidifies, like so much serum of blood. The specific gravity of the *colostrum* of the cow is about 1.072. This secretion does not turn sour like milk, but

readily putrefies; and in three or four days after the birth of the calf, is replaced by the ordinary lacteal secretion.

The colostrum of the cow, ass, and goat, has been submitted to examination very lately by MM. Chevalier and Henry. They state the property possessed by this secretion of undergoing coagulation by heat, although they have not mentioned albumen among its ingredients. It is probable that it was confounded with the mucous matter, stated by these gentlemen to be present in the fluid. The following is the result of their analysis of the colostrum of the cow:—

Casein	15.07
Mucous matter	2.00
Saccholactin, or sugar of milk	?
Butter	2.60
Water	80.33
	100.00

On taking a retrospective glance at the above remarks on the composition of cow's milk, which I have taken as a standard or type of this class of secretions, we can not help being struck with the peculiar manner in which the different component parts appear to be arranged, for the more ready nourishment of the new-born animal. Milk may be physiologically regarded as made up of three classes of ingredients, the first containing those which resemble vegetable secretions in the absence of nitrogen; the second including those which contain abundance of nitrogen, and consequently afford a proper pabulum for the growth of the young animal; the third class containing those ingredients which in the present state of chemical physiology we have no safe grounds for supposing are *digested*, or their elements re-arranged by vital chemistry, and hence differ from the first two classes in being rather *appropriated* by the vital influence of the infant animal, than assimilated to form such combinations.

A. *Ingredients of milk in which nitrogen is absent.* Sugar of milk, fatty matters.

B. *Ingredients of milk in which nitrogen is present.* Caseous matter.

C. *Inorganic, or saline ingredients.* Salts of potass, soda, lime, and iron.

The latter class contains those earthy salts which constitute the chief ingredients in osseous structures; and all being dissolved in, or diffused through, abundance of water, become fitted to pass or drain through the minutest vascular tissues.—*Lond. Med. Gaz.* April,1840, from *Sir A. Cooper's Work on the Mamma.*

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56. *Observations on the existence of certain elements of the Milk in the urine during utero-gestation; and on the application of this fact to the diagnosis of Pregnancy.*—The No. of *Guy's Hospital Reports*, for April last, contains an account of some interesting investigations by Dr. Golding Bird relative to the *Kiestein*, a newly discovered constituent of the renal secretion, existing in the urine of the human female, during utero-gestation. (See No. of this Journal, for Feb. 1840, p. 483.)

Dr. Bird first submitted to examination the urine of a married woman in the sixth month of pregnancy, and after four days exposure the urine became covered with the peculiar fat-like serum. To ascertain next whether such appearances were constant in the urine in every case of utero-gestation, Dr. B. obtained specimens from about thirty women, under his care in the Finsbury Dispensary, in the third to the last month of pregnancy, and in every case, with but three exceptions, copious fat-like pellicles were observed after two or three days exposure.

Whilst collecting these specimens of the urine of pregnant women, Dr. B. directed several young women who presented themselves to be treated for amenorrhœa at the Dispensary, to bring specimens of their urine, which were exposed simultaneous with those furnished by the pregnant women; and in two instances only, was any evidence of the presence of the peculiar matter mani-